WOMEN IN SCIENCE AND ENGINEERING SYSTEM TRANSFORMATION (WISEST)

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*including one-year no-cost extension (August 1, 2011 to July 31, 2012).

July 31, 2012

UIC WOMEN IN SCIENCE AND ENGINEERING SYSTEM TRANSFORMATION

WISEST PROGRAM SUMMARY

The UIC WISEST (Women in Science and Engineering System Transformation) Program was supported by a NSF $3.3 million ADVANCE grant from August 1 2006 to July 31 2012.[1] WISEST began prior to the NSF funding in the summer of 2003 as one of the programs at the UIC Center of Research in Women and Gender (CRWG). Its overall goal is to *increase the number, participation, and leadership status of minority and majority women in academic science and engineering through institutional transformation*. It continued to be administered by the CRWG during the grant. Since the end the grant, WISEST has been institutionalized as a campus program housed in the Office of the Vice Provost for Faculty Affairs.

During the NSF grant period, the Program was guided by campus leadership including the Vice Chancellor for Academic Affairs and Provost, the Vice Provost for Faculty Affairs, the Vice Chancellor for Research, the Dean of the College of Engineering and the Dean of Liberal Arts and Sciences. Around the time when WISEST received its NSF funding, the Provost appointed a senior faculty member to serve as its first *Special Assistant to the Provost for Diversity*, who spearheaded the campus strategic thinking and planning process for diversity to "fully actualize our commitment to integrating diversity into our core mission and daily activities."[2] The goal of WISEST had been an integral part of this campus commitment to diversity.

WISEST Organizational Structure: Change Agents for Institutional Transformation

The WISEST organizational structure contained features that ensured institutional accountability and warranted institutional commitment to the WISEST mission. Three groups of change agents within WISEST corresponded to the three elements within the Architecture of Inclusion framework identified by Susan Storm (2006)[3] as essentials for institutional transformation: namely, *organizational catalysts, institutional intermediaries* and *institutional citizenship*.

- WISEST leadership was defined by the leadership role held by individuals and not by specific individuals. Those assuming the role of Provost, Vice Provost for Faculty Affairs, Dean of Engineering and Dean of Liberal Arts and Sciences continued to lead the program ensuring institutional commitment to the WISEST mission. They, together with other members of the WISEST Executive Committee, were the *organizational catalysts* who held "*leadership positions …. situated at the intersection of organizational domains and, as a result, have the ability to use their knowledge, relationships, and credibility to create institutional change."*

- WISEST commissioned the support of two external bodies, its External Advisory Committee and its External Evaluation Team. Together with NSF, these two external bodies were the *institutional Intermediaries* who "*…. use their ongoing capacity-building role within a particular occupational section to build knowledge …. introduce incentives …. and provide accountability."*

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[1] Including a one-year no-cost extension, August 1, 2011 to July 31, 2012.

[2] "*Through the Lens of Diversity*" University of Illinois at Chicago, August 2012 http://www.uic.edu/depts/oaa/diversity/lens%20book%2008.13.12%20pdf%20version2.pdf

[3] Sturm, Susan (2006). The Architecture of Inclusion: Advancing Workplace Equity in Higher Education. *Harvard Journal of Law and Gender*, 29, 248-298.

- The Faculty-Facilitator model is an important element of the WISEST Structure. The WISEST Facilitators contributed significantly to its success. Together with the STEM Heads and STEM faculty, they were the *institutional citizenship* that "*create the conditions enabling women (and men) to participate fully and equally as citizens of the institution."*

WISEST Key Programs (2006-2012)[4]

With resources provided by NSF and UIC units (including the Office of the Vice Chancellor for Academic Affairs and Provost, Office of the Vice Chancellor for Research, as well as those of the Deans of the Colleges of Engineering and Liberal Arts and Sciences), WISEST initiated and implemented numerous programs both for the 11 departments in STEM (Science, Technology, Engineering and Mathematics) disciplines it targeted and for the entire institution as it aimed at institutional transformation. Through these programs, WISEST:

- Provided start-up support (2006-2012) to 15 new STEM women hires.

- Initiated programs to increase awareness of unconscious gender bias[5] including
    - SUCCEED training for faculty search committees (2006-2012 and continuing) and for faculty promotion and tenure committees (2010-2012 and continuing).
    - Town hall meetings (2006-2012) with vignettes and follow-up discussions.
    - First Lecture for engineering students (2010-2012 and continuing).
    - Leadership seminars (2006-2012) including two on student evaluation of teachers.

- Contributed to the implementation/revision of work-life friendly policies[6] that benefited all faculty at UIC including
    - 2 new policies: Automatic Tenure Hold Policy in August 2008 and Modified Duties Policy in January 2009.
    - 1 revised policy: Partner Accommodation Policy in March 2011.

- Supported work-life friendly programs to retain stellar faculty including
    - Infant/Toddler/Child and Elder Care Resources and Referral Program (piloted in April 2010 and became permanent in April 2011 and continuing).
    - Women in Science and Engineering Research (WISER) Funds (2006-2012) to help faculty get their career back on track after a period of intensive care giving.

[4] In this report, year X - year Y refers to the period from August 16, Year X to August 15, Year Y. 2006-2012 therefore refers to the period between from August 16, 2006 to August 15, 2012.

[5] Research (including those by Nosek B. A., M. R. Banaji and A. Greenwald who maintain the educational website at https://implicit.harvard.edu, designed to increase awareness of unconscious biases, including gender bias) show even "individuals who consciously refute gender and science stereotypes can still hold that belief at an unconscious level," and "those beliefs and implicit biases may be more powerful than explicitly held beliefs and values simply because they are not aware of them." Hill C., C. Corbett, and A. St. Rose, *Why So Few? Women in Science, Technology, Engineering, and Mathematics, AAUW*, 2010. http://www.aauw.org/learn/research/upload/whysofew.pdf).

[6] Research provides evidence that supporting faculty work-life balance is a key to attract and retain female faculty (Hill, C., C. Corbett, and A. St. Rose; 2010).

- Expanded and improved mentoring[7] and networking opportunities for STEM women including
    - WISEST Assistant Professor Initiative (WAPI; 2010-2012 and continuing) to offer mentoring and training seminars for STEM assistant professors.
    - STEM women networking luncheon (every semester from 2006 to 2012 and continuing).
    - WISEST leadership seminars and visiting scholars program (2006-2012).

- Continued to support the effective Faculty-Facilitators model (2006-2012 and continuing). WISEST Facilitators were instrumental to many WISEST initiatives including the SUCCEED faculty search training, the Postdoctoral Research Associates for Academic Diversity (PRAAD) Program, the Postdoctoral Institute for Career Development and Academic Diversity (WISEST Postdoctoral Institute), the WISEST Assistant Professor Initiative (WAPI), the Visiting Scholar program, Leadership Seminars and Lactation Room Support.

- Instituted incentives for STEM Heads to develop annual action plan to improve faculty work climate and provided them training to effectively develop those plans (2006-2012).

- Implemented an innovative postdoctoral program: Postdoctoral Research Associates for Academic Diversity (PRAAD, 2007-2009) to recruit and prepare 5 underrepresented minority STEM women for an academic career. It had a number of features distinct from those in a traditional postdoctoral program, including a Postdoctoral Institute.

- Established the STEM database and tracking systems to improve the ability to track and report on gender equity in STEM.

WISEST Assessment Effort

The WISEST assessment teams collected quantitative and qualitative data and conducted studies to evaluate the impact of the WISEST programs.

- Quantitative data included a series of 12 tables on STEM faculty data related to the NSF required outcomes as well as additional outcomes that were specific to UIC STEM population (2005-2012).

- Qualitative data included 9 sets of interviews, focus groups and surveys with various WISEST stakeholders (2006-2012).

- Studies included a salary equity study (2007-2008), faculty exit interview (2008-2009) and a faculty work climate survey (2011) as a follow-up of the 2004 faculty work climate survey.

[7] Ensuring mentoring for all faculty is another key cited in the literature as important to attract and retain female faculty (Hill, C., C. Corbett, and A. St. Rose; 2010).

WISEST Major Outcomes

WISEST quantitative and qualitative assessment as well as survey results provided evidence that its programs had resulted in significant outcomes highlighted below:

- From 2005 to 2012, STEM women increased both in number (from 34 to 48) and as a percentage of faculty (13.8% to 20.8%).[8]

- STEM women thrived at UIC. From 2005 to 2012, 20.5% (5 out of 24) of the female assistant professors hired between 2006 and 2012 received the prestigious NSF CAREER award.[9] STEM women stayed (91% retention rate during the period 2005-2012)[10] and they were tenured and promoted (86% rate during the period 2005-2012).[11]

- From 2005-2012, URM (underrepresented minority) STEM faculty (women and men) increased in number (from 10 to 15) and as a percentage of STEM faculty (from 4.0% to 6.5%). Also, URM STEM women increased in number (from 4 to 8), as a percentage of STEM women (11.8% to 16.7%) and as a percentage of all faculty (1.6% to 3.5%) during the same period.[12]

- The WISEST PRAAD is an exmplemary pilot program for increase in representation and advancement of URM STEM women. It has a number of features distinct from traditional postdoctoral programs (including 5 postdocs hired by WISEST as a cohort to conduct research in the areas of their choice, being mentored by a cadre of mentors and trained by a monthly series of seminars), which contributed to its success.[13] All 5

[8] Also, STEM women representation was 15.4% in Academic Year (AY) 2007-2008 in UIC. By comparison, 14.9% of faculty in corresponding academic science and engineering departments as a percentage of all faculty in the top 100 research universities was women in AY 2007-2008, according to Nelson, D. and C. N. Brammer (2010) *A National Analysis of Minorities in Science and Engineering Faculties in Research Universities* http://faculty-staff.ou.edu/N/Donna.J.Nelson-1/diversity/Faculty_Tables_FY07/07Report.pdf. The corresponding departments in Nelson and Brammer included Chemical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Mechanical Engineering, Biological Sciences, Chemistry, Earth Science, Mathematics and Statistics and Physics.

[9] By comparison, 12.9% (4 out of 31) newly hired male assistant professors in UIC received this prestigious award. Moreover, in total (2006-2012), 9 (47.4%) out of the 19 UIC recipients of this award were women.

[10] Also, the retention rate for STEM women assistant professors was 89.2%. By comparison, Kaminski and Geisler showed that less than half of STEM women assistant professors in 14 universities were retained at their universities within 11 years of being hired. Kaminski and Geisler. (2012) Survival Analysis of Faculty Retention in Science and Engineering by Gender. *Science*, http://www.sciencemag.org/content/335/6070/864.full.pdf?sid=70d583c8-506a-4bb6-9f4a-19384a6c285d.

[11] Two women assistant professors left during her probationary period. Adding them as those who would not be promoted and tenured at UIC, the rate of promotion and tenure for women assistant professors was 75.0%. By comparison, Kaminski and Geilser data showed that 64.2% of STEM women assistant professors in 14 universities were promoted and tenured at the same institution.

[12] By comparison, in the top 100 research universities, URM faculty as a percentage of all faculty in corresponding academic science and engineering departments was 6.0% in AY 2007; URM women as a % of women faculty and URM women as a % of all faculty in corresponding academic science and engineering departments were, respectively, 14.5% and 0.9% in AY 2007 (Nelson and Brammer, 2010).

[13] From qualitative data gathered by the WISEST Internal Evaluation Team in 2009 interviews with the WISEST postdocs http://www.uic.edu/depts/oaa/wisest/qualitative_education.html.

postdoctoral research associates secured appointments with research universities and three of them became tenure-track assistant professors.

- STEM women felt that their department heads had become more supportive. Many found that their departmental climate had been more welcoming.[14]

- Despite having gone through three years of salary freeze and one year with mandatory furlough days due to declining fiscal state support during this period, faculty became more satisfied[15] with their current position and career progression as assessed by two faculty work climate surveys conducted in 2004 (prior to the grant) and 2011 (towards the end of the grant).

    - STEM women became more satisfied with their current position (80.6% being "satisfied" in 2011 compared to 79.2% in 2004) and with their career progression (86.1% being "satisfied" in 2011 compared to 75.0% in 2004). More importantly, the percentage being "very satisfied" with their position almost doubled (from 16.7% to 27.8%) and that being "very satisfied" with their career progression more than tripled (from 12.5% to 38.9%).

    - All faculty surveyed also became more satisfied with their current position (79.1% being "satisfied" in 2011 compared to 69.5% in 2004) and with their career progression (81.9% in 2011 compared to 76.9% in 2004); with more than 10 percentage points increase in "being very satisfied" for both their position and career progression.

    - Increase in faculty satisfaction in both current position and career progression was observed for both STEM and non-STEM disciplines and both for women and men, as reflected by the results of the 2004 and 2011 faculty work climate surveys. It is important for WISEST that advancing STEM women also benefited all faculty as its goal was to increase STEM women participation and advancement through institutional transformation.

WISEST Dissemination

Through numerous presentations and publications during the grant, WISEST shared with the ADVANCE community its products, which had specific features that distinguished them from similar products developed by other institutions in the ADVANCE community. With a good understanding of their merits, they could be adapted to be implemented in other institutions to increase advancement and participation of STEM women through institutional transformation. These products included:

- WISEST organizational model: WISEST mapped within its structures three groups of change agents which played the roles of the three elements in the Architecture of Inclusion framework (Susan Storm; 2006) that were key for institutional transformation: namely, *organizational catalysts, institutional intermediaries* and *institutional citizenship*.

[14] From qualitative data gathered by the WISEST Internal Evaluation Team in 2009 interviews with STEM women faculty and 2011 interviews with recipients of WISEST start-up support http://www.uic.edu/depts/oaa/wisest/qualitative_education.html.

[15] Job satisfaction is a key to faculty retention (Hill, C., C. Corbett, and A. St. Rose; 2010).

Also, with its leaders defined by roles (not individuals) the WISEST structure guaranteed continued campus leadership.

- WISEST Faculty-Facilitator model: WISEST Facilitators who served as the champions for STEM women were senior faculty members from the same discipline as the STEM women. Eleven facilitators, one appointed in each department, worked individually and as a group to serve as mentors for STEM women, advocates of the WISEST mission in their departments, as well as linkages between the STEM faculty and the campus leadership.

- WISEST SUCCEED training program: WISEST SUCCEED training was delivered by the WISEST Faculty-Facilitators to increase awareness of unconscious gender bias in faculty search and promotion and tenure consideration. The trainers were scientists and engineers who could relate well with their colleagues the issue of having possible unconscious gender bias from their personal experience.

- WISEST unique postdoctoral program: The WISEST PRAAD had innovative features unlike that of a traditional postdoctoral program. These features contributed to the success of its postdoctoral associates.

- WISEST "First-Lecture" for engineering students: Senior faculty members delivered presentations to students on their first day of classes to increase their awareness of unconscious gender bias setting the tone for a positive learning environment built on mutual respect and inclusion.

WISEST Beyond NSF ADVANCE

Since the end of the grant, a number of WISEST programs have been institutionalized in UIC with expectation to be expanded beyond the 11 STEM departments in the future.

- WISEST has been integrated into the Office of the Vice Provost for Faculty Affairs with a new Director and funding from the Provost.

- SUCCEED training has been made mandatory for faculty search committees and promotion and tenure committees in the Colleges of Engineering and Liberal Arts and Sciences. It also has become part of the annual orientation for the Campus Promotion and Tenure Committee.

- The WISEST Faculty-Facilitators continue to be funded by the Provost and the Deans in the 11 STEM departments.